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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/544,181	08/02/2005	Kimihiko Sato	276159US3PCT	8335
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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER STIMPERT, PHILIP EARL	
			ART UNIT	PAPER NUMBER
			3746	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/544,181	Applicant(s) SATO, KIMIHIKO	
	Examiner Philip Stimpert	Art Unit 3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 November 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 August 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 18 November 2008 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 13-16 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

4. Regarding claims 13 and 15, while the specification provides support for a gaseous coolant in some embodiments, the examiner finds no explicit support for the negative limitation of no liquid contacting the shaft.

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5. Regarding claims 14 and 16, while the specification provides support for a path for gas from the impeller to the bearing, the examiner finds no explicit support for the negative limitation of the lack of a seal between the impeller and the bearing.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 14 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. Regarding claims 14 and 16, these claims recite, in relevant part, that “the collar and the heat receiving portion provide a path for gas from the heat resisting impeller to travel to the bearing without a seal.” It is unclear whether this claim intends to limit the fan such that there is no seal whatsoever, or whether the provision of gas pathway is contingent on the presence or absence of the seal.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1, 3-5, 7-10, 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lefevre et al. (US 5,334,004) in view of Jekat et al. (US 5,108,715).

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11. Regarding claim 1, Lefevre et al. teach a fan comprising an impeller (14) cantilevered by a rotating shaft (20), bearings (24) attached to the rotating shaft, a heat insulating layer (right side of the rotor housing in Fig. 1) disposed between the impeller (14) and the bearings (24) and a cooling portion (around 44) disposed between at least part of the heat insulating layer and the bearings (24). Lefevre et al. also teach a first magnetic coupling (32, 34) which is mated with another, second coupling (36, 40), and that the first magnetic coupling (32, 34) is disposed on a right-hand shaft end of the rotating shaft (20) opposite the impeller (14). Lefevre et al. also teach a non-magnetic (col. 3, ln. 49) partition wall (26) disposed between the first and second coupling, and that the second magnetic coupling is disposed on the shaft end of a driving shaft (38) of a motor (col. 1, ln. 21-23, col. 2., ln 12-20), whereby a space surrounding the rotating shaft (20) is hermetically sealed (col. 3, ln. 45-46) from an exterior of the fan by the non-magnetic partition wall (26) and a casing (substantially the same as the heat insulating layer). Lefevre et al. also teach a collar (42, 44) positioned between the right side of the heat insulating layer and the impeller, and between the heat insulating layer and the rotating shaft (20). One of ordinary skill would expect that the collar, which functions as a seal, would be formed of a different material, such as rubber. The examiner notes that while Lefevre et al. do not teach explicitly that their impeller is heat resistant, a certain degree of heat resistance is inherent in any such impeller, else it would melt at a normal operating temperature, or even a lower temperature. Lefevre et al. do not teach that the cooling portion includes a cooling fluid which does not contact the shaft and bearings. Jekat et al. teach an impeller pump (see the drawing figure) which includes a

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cooling portion (64) in which fluid circulates for cooling without contacting the bearings or lubricating fluids of a shaft. One of ordinary skill would appreciate that this arrangement would allow for prevention of mixing of the lubricant and refrigerant, and that for some combinations of those substances, such prevention would be advantageous. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the fan of Lefevre et al. with a cooling portion as taught by Jekat et al. so as to prevent mixing of the shaft lubricants and refrigerant.

12. Regarding claim 3, Lefevre et al. teach a fan comprising an impeller (14) cantilevered by a rotating shaft (20), bearings (24) attached to the shaft (20), a heat insulating layer (right side of the rotor housing in Fig. 1) disposed between the impeller (14) and the bearings (24). Lefevre et al. also teach a collar (42, 44) positioned between the right side of the heat insulating layer and the impeller, and between the heat insulating layer and the rotating shaft (20). One of ordinary skill would expect that the collar, which functions as a seal, would be formed of a different material, such as rubber. According to the combination, Jekat et al. teach that the heat insulating layer comprises a heat receiving portion (64) which would be disposed between the bearings and the left part of the heat insulating layer of Lefevre et al., an air cooling/radiating portion (54) provided at an outer side of a casing (26) and a heat transporting portion (58) connecting the heat receiving portion to the air cooling/radiating portion (54). According to the present combination, the heat receiving portion would include a cooling fluid to remove heat from the bearing and rotating shaft without contact therewith, as taught by Jekat et al.

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13. Regarding claim 4, according to the combination, the heat receiving portion of Jekat et al. and the cooling apparatus taught by Lefevre et al. would unify to form a thermo-siphon heat pipe.

14. Regarding claim 5, Jekat et al teach that the cooling portion includes a heat receiving portion (64) which is disposed between the bearings and the left part of the heat insulating layer, while Lefevre et al. teach an air cooling/radiating portion (54) provided at an outer side of a casing (26) and a heat transporting portion (58) connecting the heat receiving portion to the air cooling/radiating portion (54).

15. Regarding claims 7-8, neither Lefevre et al. nor Jekat et al. explicitly teach adaptation to a solid oxide fuel cell. However, while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function, because apparatus claims cover what a device is, not what a device does (Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990)). Thus, if a prior art structure is capable of performing the intended use as recited in the preamble, or elsewhere in a claim, then it meets the claim. In this case, the examiner submits that one of ordinary skill would appreciate that a combination of Lefevre et al. and Jekat et al. provides for a fan which is configurable for attachment to a solid oxide fuel cell, and that the limitations of claims 7 and 8 therefore are met.

16. Regarding claims 9-10, Lefevre et al. teach a mechanical seal (42, 44). As shown in Fig. 1 of Lefevre et al., the first seal (42) also acts as a spacer for the second (44). Further, in the combination, this first seal (42) would be located between at least

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portions of the heat insulating layer and the heat receiving portion. Finally, as with the impeller, at least a minimal amount of insulation is inherent in any material seal, so heat transfer between the heat insulating layer and the heat receiving portion would be at least partially blocked.

17. Regarding claims 14 and 16, as best understood by the examiner, these claims read on a combination of Lefevre et al. and Steinetz et al. In particular, if the collar (42, 44), or seal, were removed, a path for gas from the impeller to the bearings would be established.

18. Claims 2, 13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lefevre et al. in view of Jekat et al. as applied to their respective parent claims above, and further in view of Steinetz et al. (US, 5,076,590).

19. Regarding claim 2, Lefevre et al. and Jekat et al. do not teach that the hermetically sealed space is filled with an inert gas. Steinetz et al. in general teach a sealing apparatus. However, they particularly teach that an inert gas may be used as a simultaneously as an inert purge gas and a coolant (col. 5, ln. 5-12) which prevents leakage of potentially explosive gases. Lefevre et al. teach that the fan of Lefevre is designed for use with "a dangerous gas, e.g. a gas that is toxic or explosive," (col. 1, ln. 10). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to fill the hermetically sealed space of the fan of Lefevre with an inert gas, as taught by Steinetz et al.

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20. Regarding claims 13 and 15, in the present combination, the hermetically sealed space of Lefevre et al. is filled with gas as taught by Steinetz et al. As such, one of ordinary skill would recognize that there would remain no liquid in the system to contact the rotating shaft. One of ordinary skill would recognize the feasibility of such a combination, given the teachings of Steinetz et al. as to the cooling effect of the inert gas.

21. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lefevre et al. in view of Jekat et al. (and Steinetz et al. as necessary), and further in view of Maeda et al. (US 4,815,418).

22. Lefevre et al. teach a scroll (12). However, Lefevre et al. and Jekat et al. do not teach an inertia dust collector provided at the inlet port of the scroll. Maeda et al. teach an inertia dust collector (20, see col. 8, ln. 41), and that the dust collector separates out most particulate matter (col. 8, ln. 35-54). One of ordinary skill in the art would appreciate that such particles would effect a deleterious wear on the relatively moving parts of the fan of Lefevre et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the fan of Lefevre et al. to provide an inertia dust collector as taught by Maeda et al. in order to separate out particulate matter from the gas flowing to the impeller and thereby decrease wear on the relatively moving parts of the fan.

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23. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lefevre et al. in view of Jekat et al. as applied to claims 1 and 3 respectively above, and further in view of Fabares et al. (US 2,746,684).

Regarding claims 11-12, Lefevre et al. teaches using the heat exchanger (54) to adjust temperature and pressure within the fan (col. 4, ln. 49-53). However, neither Lefevre et al. nor Jekat et al. teach particular temperatures or pressures relative to the dew point of a process gas. Fabares et al. teach an apparatus for preventing corrosion in a generally closed chamber. This is done in part by reducing "the aqueous dewpoint of the air directed into the chamber to a point less than the temperature of the contents of the tank," so as to reduce condensation. It is common knowledge to those of ordinary skill in the art that dewpoint and boiling points may are functions of temperature and pressure. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to control the heat exchanger Lefevre et al. to maintain the temperature and pressure of the cooling fluid so as to reduce condensation and thereby corrosion as taught by Fabares et al. In particular, it would have been obvious to maintain the cooling fluid at a temperature higher than the dew-point of the process gas, and to simultaneously adjust the pressure so as to raise the boiling point of the cooling fluid above that dew-point.

Response to Arguments

24. Applicant's arguments, see page 8, filed 18 November 2008, with respect to the abstract of the specification have been fully considered and are persuasive. The objection to the specification has been withdrawn.

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25. Applicant's further arguments have been fully considered but they are not persuasive.

26. With respect to the argument that Lefevre et al. does not teach a collar, the examiner disagrees. The wet seal (42, 44) of Lefevre et al. satisfies the positioning limitations of the claim, and as noted above, would reasonably be considered to comprise a different material than the heat insulating layer. The examiner notes that the claim does not recite the gas flow contamination prevention cited by the arguments. Further, no claims currently limit the heat insulating layer with respect to the casing or scroll, either by material properties or structural relation.

27. With respect to the argument that Lefevre et al. and Jekat et al. both teach embodiments preventing gas flow from the impeller to the bearings, the examiner agrees. However, as noted above in the rejections of claims 14 and 16 under 35 U.S.C. 103(a) and 112, the examiner believes the claim language as written reads on a combination of those references due to its lack of clarity.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Philip Stimpert whose telephone number is (571)270-1890. The examiner can normally be reached on Mon-Fri 7:30AM-4:00PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/
Supervisory Patent Examiner, Art
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26 March 2009